Remarks

Reconsideration and withdrawal of the rejections set forth in the Office action dated March 12, 2008 are respectfully requested.

Claims 1-18 and 21 are pending. Claims 13-18 and 21 are withdrawn. Claims 19-20 are canceled.

I. Amendments

Claims 1 and 3-8 are amended to standardize terminology and to improve readability.

Claim 2 is amended for proper grammar.

No new matter is added by way of these amendments.

II. Rejections under 35 U.S.C. §102

Claims 1, 2, 9, 11, and 12 were rejected under 35 U.S.C. § 102(b) as allegedly anticipated by Boxer *et al.* (PCT Publication No. 98/23948).

Applicants respectfully traverse these rejections.

A. The Present Claims

The present claims relate to an array of separated lipid bilayers. The array includes one or more lipids derivatized with an oligonucleotide having a surface region specific sequence and at least one biomolecule anchored to at least one of the lipid bilayer expanses through a complementary oligonucleotide sequence capable of specifically hybridizing with the surface region specific oligonucleotide sequence in that expanse, such that the biomolecule is anchored to that expanse.

B. The Cited References

BOXER ET AL. relate to a surface detector array formed of a substrate having a surface defining a plurality of distinct bilayer-compatible surface regions separated by one or more bilayer barrier regions. The bilayer-compatible surface regions may further include a selected biomolecule covalently or non-covalently attached to a

lipid molecule (see page 4 line 32 through page 5, line 2). Examples of biomolecules include polynucleotides and nucleic acids (see page 5, lines 4-5 and page 16, line 4). The bilayer may be derivatized with groups or compounds to create a surface having the desired surface exemplified by a ligand bound to the surface of the lipid by attachment to surface lipid components (see page 11, line 32 through page 12, line 2). Specific high-affinity molecular interactions may be employed to link biomolecules to a supported layer (see page 18, lines 7-8).

C. Analysis

According to the M.P.E.P. § 2131, "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference".

The present claims include a require a plurality of lipid bilayer expanses containing one or more lipids derivatized with an oligonucleotide having a surface region specific oligonucleotide.

Among other deficiencies, nowhere do Boxer *et al.* teach one or more lipids derivatized with an oligonucleotide having a surface region specific sequence. The Examiner points to page 16, lines 3-5 for a teaching that the bilayer may contain receptors of other biomolecules attached to or incorporated into the bilayer. Nowhere does Boxer *et al.* teach that the receptor has a surface region specific sequence as in the present claims. Therefore, Boxer *et al.* do not disclose each and every element of Applicants' claims. Accordingly, Applicants respectfully request withdrawal of the rejections under 35 U.S.C. § 102.

III Rejections under 35 U.S.C. §103

Claims 1, 2, and 9-12 were rejected under 35 U.S.C. §103 as allegedly obvious over Boxer *et al.* in view of Cornell *et al.* (U.S. Patent No. 5,874,316), Arnold *et al.* (U.S. Patent No. 5,310,648), or Bayerl *et al.* (U.S. Patent No. 6,051,372).

Claims 1-7 and 9-12 were rejected under 35 U.S.C. §103 as allegedly obvious over Boxer *et al.* in view of both Boukobza *et al.* (*J Phys Chem*, 105:12165-12170, 2001) and Niemeyer (DE 19902391, abstract).

Claims 1, 2, 8, 9, 11, and 12 were rejected under 35 U.S.C. §103 as allegedly obvious over Boxer *et al.* in view of Shen *et al.* (U.S. Publication No. 2003/0148335).

These rejections are respectfully traversed.

A. The Present Claims are described above.

B. The Cited References

BOXER ET AL. is described above.

CORNELL ET AL. relate to receptor binding of an analyte.

ARNOLD ET AL. describe an imprinted matrix which exhibits selective binding interactions through metal chelates.

BAYERL ET AL. describe two-dimensional patterning of a three-dimensional surface by a template molecule.

BOUKOBZA ET AL. describe an immobilization technique using biotin-avidin interaction. Large unilamellar lipid vesicles are attached to a glass-supported lipid bilayer through the biotin-avidin binding interaction.

NIEMEYER ET AL. states reversible, parallel, site-specific immobilization of macromolecules on a solid phase comprising using nucleic acids as immobilization-mediating reagents is new.

C. Analysis

According to the M.P.E.P. § 2143, "to establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of

success. Third, the prior art references (or references when combined) must teach or suggest all the claim limitations."

1. Rejection over Boxer *et al.* in view of Cornell *et al.*, Arnold *et al.*, or Bayerl *et al.*

The deficiencies of Boxer *et al.* are discussed above. Nor do any of Cornell *et al.*, Arnold *et al.*, or Bayerl *et al.* provide the missing teaching as these references makes no mention of complementary oligonucleotides for binding of a biomolecule to the lipid bilayer expanses much less a plurality of lipid bilayer expanses containing one or more lipids derivatized with an oligonucleotide having a surface region specific oligonucleotide. Instead, each of Cornell *et al.*, Arnold *et al.*, and Bayerl *et al.* are cited for a teaching of the use of self-limiting lateral diffusion as in present claim 10.

As noted in Applicant's response dated December 14, 2006, each of the cited references describes methods for restricting lateral diffusion rather than self-limiting lateral diffusion as in the present.

2. Rejection over Boxer *et al.* in view of Boukobza *et al.* and Niemeyer

The deficiencies of Boxer *et al.* are detailed above. Nor do either of Boukobza *et al.* and Niemeyer provide the missing teaching.

Boukobza *et al.* teach using biotin-avidin affinity for binding biomolecules to surface-tethered lipid vesicles. Importantly, due to the nature of biotin-avidin affinity, the entire bilayer expanse is affected similarly. In contrast, the present array includes an oligonucleotide having a surface region specific sequence.

The abstract of Niemeyer makes no mention of at least one biomolecule anchored to a lipid bilayer expanse through complementary oligonucleotide sequences much less a plurality of lipid bilayer expanses containing one or more lipids derivatized with an oligonucleotide having a surface region specific oligonucleotide. Niemeyer instead relates to "site-specific immobilization of macromolecules on a solid phase."

3. Rejection over Boxer *et al.* in view of Shen *et al.*

The deficiencies of Boxer *et al.* are discussed above. Nor does the Shen *et al.* reference provide the missing teaching. Shen et al. make no mention of complementary oligonucleotides for binding of a biomolecule to a lipid bilayer expanses much less a plurality of lipid bilayer expanses containing one or more lipids derivatized with an oligonucleotide having a surface region specific oligonucleotide. Instead, Shen *et al.* is cited for a teaching of the use of oligonucleotide identification tags to identify a non-nucleic acid target. Shen *et al.* is directed toward detecting non-nucleic acid targets, most often protein targets, in a sample. By contrast, the present claims are not concerned with assaying for the presence of non-nucleic acid targets. Instead, the oligonucleotides of the present claims are used for tethering the biomolecule to the bilayer expanse.

As the references, alone or in combination, fail to teach or suggest all the claim limitations, the Examiner has failed to establish a prima facie case of obviousness. Accordingly, Applicants respectfully request withdrawal of the rejections under 35 U.S.C. § 103.

If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is encouraged to call the undersigned at (650) 590-1939.

Respectfully submitted

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